Thoracic empyema after laparoscopic cholecystectomy: an unusual cause

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Abstract
Thoracic empyema after laparoscopic cholecystectomy is a rare complication. It is associated with dropped gallstones during the operation. In this case, we report a hepatocellular adenoma hemorrhage underneath an old diaphragm rupture, causing empyema after laparoscopic cholecystectomy.

Key words
Cholecystectomy · Laparoscopic · Empyema · Hepatocellular adenoma · Diaphragm

Introduction
Empyema rarely presents as a complication after laparoscopic cholecystectomy. This complication has been associated with dropped gallstones, which may erode through the diaphragm or may migrate through preexisting defects in the diaphragm. It has also been associated with rupture of a hydrated cyst in the liver or a ruptured choledochal cyst. We present a unique case of symptomatic right-sided thoracic empyema after laparoscopic cholecystectomy caused by hemorrhage of a hepatocellular adenoma underneath a preexisting diaphragmatic rupture.

Case report
A 64-year-old woman was referred to our surgical outpatient clinic by the internal medicine department. She had been admitted to our hospital for cholangitis based on choledolithiasis; and she underwent endoscopic retrograde cholangiopancreatography with papillotomy and gallstone extraction. She also mentioned a scooter accident that had occurred 35 years ago without any lasting damage.

Ultrasonography (US) of the abdomen showed no abnormalities apart from the cholecystolithiasis. She therefore was scheduled for a laparoscopic cholecystectomy. Surgery was performed under general anesthesia.

Laparoscopic cholecystectomy was performed by a three-trocar approach. A Veress needle was inserted through a subumbilical incision, and pneumoperitoneum was established with carbon dioxide at a maximum pressure of 12 mmHg. Second and third trocars were placed subxiphoidally and in the right upper abdomen, respectively. After confirming the critical view of safety, the cystic duct and cystic artery were clipped. During dissection of the gallbladder some bile leakage occurred, but stone spillage did not occur. There were no signs of bleeding, and the gallbladder was removed using an Endobag.

Two days postoperatively our patient developed shortness of breath and signs of infection without any abdominal complaints. The chest radiograph showed right-sided pleural effusion. The patient was given antibiotics (cefuroxim) with the presumptive diagnosis of hospital-acquired pneumonia. The following day, US-guided drainage was performed and 900 ml of blood was aspirated. On closer investigation with a CT scan, the
patient was found to have a large loculated pleural effusion. (Fig. 1)

When intercostal drainage failed, we decided to operate. Drainage alone in combination with fibrinolysis was not indicated owing to the previous suspicion of a hemothorax. During (muscle-sparing) thoracotomy, an infected hematoma was drained and the lung decorticated. Further exploration of the thoracic cavity revealed an old diaphragmatic rupture, with a hepatocellular adenoma diagnosed on clinical image just underneath the rupture. No biopsy specimens of the hepatocellular adenoma were obtained because of the risk of rebleeding. The hemorrhage must have been caused by traction of the diaphragm on the hepatocellular adenoma during insufflation of the peritoneal cavity (Fig. 2). There was no inflowing of infectious pleural effusion into the peritoneal cavity due to adhesions around the diaphragmatic rupture. In retrospect, the diaphragmatic rupture and the intrathoracic liver tissue were visible on a CT scan performed 5 years prior to this episode to evaluate lung problems (Fig. 3).

After closing the diaphragmatic rupture with nonabsorbable sutures and inserting two chest tubes, the thoracic cavity was closed. Bacterial culture was positive for *Citrobacter*, so we switched from antibiotics to cotrimoxazole. Postoperatively, the patient recovered slowly. After three negative cultures of pleural fluid, the chest tubes were removed. The patient was discharged in moderate condition after 2 weeks.

**Discussion**

Empyema may present as a complication after laparoscopic cholecystectomy. It is caused mostly by a super-